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Multilateral approaches to the nuclear fuel cycle

Working paper submitted by the Republic of Korea

Growing interests in nuclear energy

1. The Republic of Korea notes that an increasing number of States have been showing interest in electricity generation using nuclear energy, in parallel with the rise in concerns over climate change caused by greenhouse gas emissions and the unstable nature of international oil prices. According to a recent report by the International Atomic Energy Agency (IAEA), the world's capacity for nuclear power generation will grow from 372 GW(e) in 2007 to 473 GW(e) at the low end of the projection and 748 GW(e) at the high end by 2030. The number of countries operating nuclear power plants is expected to grow from 30 at present to 50 by 2030.

2. The resurgence of interest in nuclear energy may result in the spread of sensitive nuclear technologies, which in turn may give rise to an increase in international concerns over nuclear proliferation. While the legitimate right of States for the peaceful use of nuclear energy under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) should be fully respected, the international community should seek effective approaches to address the proliferation risk resulting from access to sensitive nuclear fuel technology by an increasing number of countries. Against this backdrop, there have been active discussions on a multilateral scheme for the assurance of nuclear fuel supply or multilateral approaches to the nuclear fuel cycle. Since Dr. ElBaradei, Director General of IAEA, reignited and encouraged discussions on multilateral approaches to the nuclear fuel cycle in 2003, there have been 12 proposals or papers on multilateral approaches to the nuclear fuel cycle submitted to IAEA.

3. As the Republic of Korea is heavily dependent on nuclear energy and maintains a sizable civil nuclear programme, stable, sustainable and economic access to nuclear fuel is of crucial importance. For this reason, the Republic of Korea is paying close attention to the current international discussions on multilateral approaches to the nuclear fuel cycle and shares its basic philosophy, which is to promote peaceful uses of nuclear energy under a multilateral framework,

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while addressing concerns over nuclear proliferation in the looming era of nuclear renaissance. In this regard, the Republic of Korea fully supports international efforts to realize the goals and spirit of initiatives on multilateral approaches to the nuclear fuel cycle and is willing to constructively participate in discussions on this subject.

Uniqueness of the Republic of Korea in developing peaceful nuclear energy

4. In just three decades since the introduction of its first nuclear power plants in 1978, the Republic of Korea has grown to become the world's sixth major nuclear power-generating country, with 20 reactors in operation. The proportion of nuclear power is expected to increase from approximately 40 per cent in 2008 up to around 60 per cent by 2030, with the number of nuclear power plants doubled.

5. Importing 98 per cent of its energy resources for domestic consumption, the Republic of Korea has significantly depended upon nuclear energy for its socio-economic development during the past decades. Without nuclear energy, the Republic of Korea may have not been able to maintain its sustainable development throughout the world oil crises in the 1970s and 1980s and the financial crisis in the late 1990s. Even now, the Republic of Korea is taking advantage of nuclear energy in overcoming the worldwide economic recession.

6. The Republic of Korea, which does not possess a sensitive nuclear fuel cycle facility, has depended upon the international commercial uranium and uranium enrichment service market to supply its nuclear fuel needs. Purchasing enrichment services from several different countries, the Republic of Korea has faced no difficulties in gaining access to the international commercial nuclear fuel and related service market during the course of its nuclear energy development. One important lesson the Republic of Korea has learned in developing its peaceful nuclear programme is that the transparency of and international confidence in a country's peaceful nuclear programme are crucial.

7. In the light of its unique experience in developing a peaceful nuclear programme, the Republic of Korea is of the view that, in order to ensure the success of current or future multilateral schemes for the nuclear fuel cycle, it is important to take into account the following criteria in their planning and deliberations.

A. Consideration of the dynamics of the market mechanism

8. The Republic of Korea supports the very basic concept, already endorsed by several proposals and papers on multilateral approaches to the nuclear fuel cycle, that the multilateral approaches to the nuclear fuel cycle should serve as a complement to, and backup of, the existing market mechanism. In this connection, the Republic of Korea is of the view that they also should not impede or distort the well-functioning commercial nuclear fuel service market, where the interaction between supply and demand decides the market price of the fuel services.

9. However, by focusing mainly on the assurance side of fuel supply rather than supply itself, most of the proposals on multilateral approaches to the nuclear fuel cycle currently on the table seem to have failed in giving appropriate consideration to the demand side of nuclear fuel services. Also, by presuming a static market situation, they seem to have neglected the dynamics of the market mechanism.

10. Fuel supply or access to fuel services does not happen in a vacuum. The increasing demand for nuclear fuel services required for expanded nuclear power generation will give rise to an increase in fuel service prices if there is no corresponding increase in the capacity of world nuclear fuel supply services. If the supplier States do not respond properly in time to the increasing demand, in particular for non-market or non-proliferation reasons, States may be tempted to develop indigenous fuel technology, rather than be discouraged from doing so. Thus, the Republic of Korea believes that multilateral approaches to the nuclear fuel cycle should take into account both the supply and the demand side of nuclear fuel within the dynamics of the market mechanism, and not only the assurance of nuclear fuel in case of a supply disruption for political reasons, which is unlikely to happen as long as the consumer States are in good standing with regard to non-proliferation. Multilateral approaches to the nuclear fuel cycle should comprehensively take into account both supply and demand in a way that reduces incentives of States to acquire indigenous sensitive nuclear fuel cycle.

B. Balance between legitimate right and safeguards obligations

11. On the political front of considerations on multilateral approaches to the nuclear fuel cycle, the Republic of Korea believes that multilateral approaches to the nuclear fuel cycle should not be implemented in a way that denies or limits the legitimate right to the peaceful uses of nuclear energy. There are two factors to consider in assessing the "legitimacy" of States to pursue indigenous sensitive fuel cycle technology: (1) economic feasibility; and (2) energy security. Economic feasibility could be determined by comparing the reasonableness of the market price to the expected price when nuclear fuel is produced directly by States, while energy security may depend on the share of nuclear energy in a State's total energy supply. If multilateral approaches to the nuclear fuel cycle raise an unjustifiable barrier for new suppliers with legitimate needs for sensitive nuclear fuel technologies and facilities, they will perpetuate the current structure of the nuclear fuel market and produce a deeper gap between the suppliers (haves) and the consumers (have-nots).

12. On the other hand, the Republic of Korea firmly believes that the inalienable right under article IV to develop research on, produce and use nuclear energy for peaceful purposes is to be exercised in strict accordance with the non-proliferation and safeguards obligations contained in articles I, II and III of the NPT. It is the view of the Republic of Korea that States can enjoy the right under article IV to the extent that they implement safeguards and commit to non-proliferation obligations. From this perspective, the Republic of Korea places emphasis on the Additional Protocol and an effective domestic export control system as important indicators in assessing a State's commitments to non-proliferation obligations.

C. Inclusion of back-end cycle in the multilateral approaches to the nuclear fuel cycle

13. The majority of proposals drawn up so far cover only front-end issues of the entire nuclear cycle, disregarding problems associated with the world's growing inventory of spent fuel. However, back-end cycle-related issues, such as treatment

of spent nuclear fuel are as sensitive to proliferation as is uranium enrichment, a major proliferation issue related to the front-end cycle.

14. Therefore, the Republic of Korea places the same emphasis on international cooperation to build up multilateral solutions for back-end cycle problems as well as for front-end cycle problems. The Republic of Korea, facing increasing difficulty in the storage of spent nuclear fuel, hopes that current or future proposals on multilateral approaches to the nuclear fuel cycle will include the entire nuclear fuel cycle, and supports the idea of international reprocessing and reprocessing/recycling centres.

D. Incentives, not control-based approaches

15. The key question for the success of proposals on multilateral approaches to the nuclear fuel cycle is how can these schemes be made attractive to non-nuclear weapon States. Non-nuclear weapon States are unlikely to buy proposals on multilateral approaches to the nuclear fuel cycle if they deny, limit or forfeit the right of peaceful use of nuclear energy or if non-nuclear weapon States do not feel an urgent and reasonable need to find alternatives to sole reliance on the current market. If States believe that it is more economically efficient to import nuclear fuel from abroad, their incentive to construct their own facilities, and its legitimacy, will be substantially reduced.

16. Against this backdrop, the Republic of Korea believes that it is more desirable and realistic for proposals on multilateral approaches to the nuclear fuel cycle to take incentive-oriented approaches, such as assuring the supply of nuclear fuel at an economically attractive price at all times or providing entire nuclear fuel cycle services, from supply of nuclear fuel to radioactive waste management of nuclear waste, including spent fuel recycling, on more favourable terms, in exchange for the voluntary commitment to refrain from seeking sensitive nuclear fuel cycle facilities for an extended period.

E. More responsibility of nuclear weapon States and supplier countries

17. The Republic of Korea agrees to the view, as indicated by Dr. ElBaradei in his statement to the IAEA Board of Governors' Conference in March 2009, that multilateral approaches to the nuclear fuel cycle is not a stand-alone issue, but rather that it is linked with nuclear non-proliferation and nuclear disarmament. The Republic of Korea emphasizes joint efforts and cooperation between non-nuclear-weapon States and nuclear weapon States for the success of multilateral approaches to the nuclear fuel cycle.

18. In particular, nuclear-weapon States and nuclear supplier countries should undertake greater efforts and more financial responsibility to build up international confidence in multilateral approaches to the nuclear fuel cycle in the initial stages in order to convince the international community that the benefits of multilateral approaches to the nuclear fuel cycle go to all participants. In this regard, it was welcoming to see the United States and the Russian Federation show their good faith by providing 17 metric tons of highly enriched uranium and 120 metric tons of

low-enriched uranium, respectively, to bolster their own assurance mechanisms. The Republic of Korea hopes that nuclear-weapon States will donate a certain portion of highly enriched uranium produced as a result of nuclear disarmament to an international nuclear fuel bank as a world peace dividend. The Republic of Korea also hopes that gradual accumulation of such confidence-building initiatives by nuclear-weapon States will, in turn, provide a solid ground for the development of discussions on multilateral approaches to the nuclear fuel cycle into the next step.